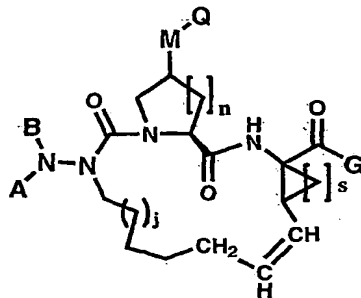


## WHAT IS CLAIMED:

## 1. A compound of Formula I:



(I)

5

wherein

A is selected from:

(a) hydrogen;

(b)  $-(C=O)-O-R_1$ , where  $R_1$  is selected from:

10

1. hydrogen,
2.  $C_1-C_6$  alkyl,
3.  $C_3-C_{12}$  cycloalkyl,
4. substituted  $C_3-C_{12}$  cycloalkyl,
5. aryl,
6. substituted aryl,
7. heteroaryl,
8. substituted heteroaryl,
9. heterocycloalkyl,
10. substituted heterocycloalkyl, or

15

11.  $-C_1-C_6$  alkyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;

20

(c)  $-(C=O)-R_2$ , where  $R_2$  is selected from:

25

1.  $-R_1$ , where  $R_1$  is as previously defined,
2. alkylamino,

3. dialkyl amino,

4. arylamino, or

5. diarylamino;

(d)  $-\text{C}(=\text{O})-\text{NH}-\text{R}_2$ , where  $\text{R}_2$  is as previously defined;

5 (e)  $-\text{C}(=\text{S})-\text{NH}-\text{R}_2$ , where  $\text{R}_2$  is as previously defined;

(f)  $-\text{S}(\text{O})_2-\text{R}_2$ , where  $\text{R}_2$  is as previously defined;

B is hydrogen or  $\text{C}_1-\text{C}_6$  alkyl;

G is

(a)  $-\text{OH}$ ;

10 (b)  $-\text{O}-(\text{C}_1-\text{C}_{12} \text{ alkyl})$ ;

(c)  $-\text{NH}-\text{R}_2$ , where  $\text{R}_2$  is as previously defined;

(d)  $-\text{NHS}(\text{O})_2-\text{R}_1$ , where  $\text{R}_1$  as previously defined;

(e)  $-(\text{C}=\text{O})-\text{R}_2$ , where  $\text{R}_2$  as previously defined;

(f)  $-(\text{C}=\text{O})-\text{O}-\text{R}_1$ , where  $\text{R}_1$  as previously defined; or

15 (g)  $-(\text{C}=\text{O})-\text{NH}-\text{R}_2$ , where  $\text{R}_2$  as previously defined;

M is absent or selected from:

(a)  $-\text{O}-$ ;

(b)  $-\text{S}-$ ;

(c)  $-\text{NH}-$ ; or

20 (d)  $-\text{NR}_1-$ , wherein  $\text{R}_1$  is previously defined;

Q is selected from:

(a) aryl;

(b) substituted aryl;

(c) heteroaryl;

25 (d) substituted heteroaryl;

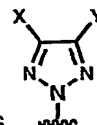
(e) heterocycloalkyl; or

(f) substituted heterocycloalkyl;

$j = 0, 1, 2, 3$ , or  $4$ ;

$n = 0, 1$ , or  $2$ ; and

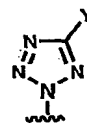
30  $s = 0, 1$ , or  $2$ .



2. A compound of formula I, wherein M is absent and Q is ,

wherein X and Y are each independently selected from:

- a)  $-C_1-C_6$  alkyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
  - b)  $-C_2-C_6$  alkenyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
  - c)  $-C_2-C_6$  alkynyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
  - d) aryl;
  - e) substituted aryl;
  - f) heteroaryl;
  - g) substituted heteroaryl;
  - h) heterocycloalkyl; or
  - i) substituted heterocycloalkyl;
- or in the alternative, X and Y are taken together with the carbons to which they are attached to for a cyclic moiety selected from: aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;



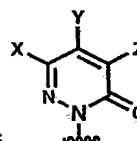
3. A compound of formula I, wherein M is absent and Q is

wherein Y is selected from:

- a)  $-C_1-C_6$  alkyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;

- b)  $-C_2-C_6$  alkenyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 5 c)  $-C_2-C_6$  alkynyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- d) aryl;
- 10 e) substituted aryl;
- f) heteroaryl;
- g) substituted heteroaryl;
- h) heterocycloalkyl; or
- i) substituted heterocycloalkyl;

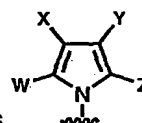
15



4. A compound of formula I, wherein M is absent and Q is  
 wherein X, Y, and Z are each independently selected from:
- a)  $-C_1-C_6$  alkyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from  
 20 halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- b)  $-C_2-C_6$  alkenyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from  
 25 halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- c)  $-C_2-C_6$  alkynyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from  
 halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 30 d) aryl;
- e) substituted aryl;

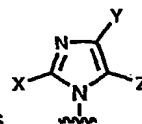
- f) heteroaryl;
- g) substituted heteroaryl;
- h) heterocycloalkyl; or
- i) substituted heterocycloalkyl;

5 or in the alternative, X and Y or Y and Z are taken together with the carbons to which they are attached to for a cyclic moiety selected from: aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;



- 10 5. A compound of formula I, wherein M is absent and Q is wherein W, X, Y, and Z are each independently selected from:
- a)  $-C_1-C_6$  alkyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
  - 15 b)  $-C_2-C_6$  alkenyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
  - 20 c)  $-C_2-C_6$  alkynyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
  - d) aryl;
  - 25 e) substituted aryl;
  - f) heteroaryl;
  - g) substituted heteroaryl;
  - h) heterocycloalkyl; or
  - i) substituted heterocycloalkyl;
- 30 or in the alternative, W and X, X and Y, or Y and Z are taken together with the carbons to which they are attached to for a cyclic moiety selected from:

aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;

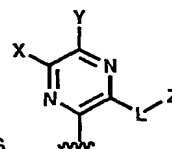


6. A compound of formula I, wherein M is absent and Q is

5 wherein X, Y, and Z are each independently selected from:

- a)  $-C_1-C_6$  alkyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 10 b)  $-C_2-C_6$  alkenyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 15 c)  $-C_2-C_6$  alkynyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- d) aryl;
- e) substituted aryl;
- 20 f) heteroaryl;
- g) substituted heteroaryl;
- h) heterocycloalkyl; or
- i) substituted heterocycloalkyl;

25 or in the alternative, Y and Z are taken together with the carbons to which they are attached to for a cyclic moiety selected from: aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;



7. A compound of formula I, wherein M is  $-O-$  and Q is

wherein

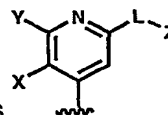
L is M, where M is as previously defined;

X, Y, and Z are each independently selected from:

- 5 a)  $-C_1-C_6$  alkyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 10 b)  $-C_2-C_6$  alkenyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 15 c)  $-C_2-C_6$  alkynyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- d) aryl;
- e) substituted aryl;
- f) heteroaryl;
- g) substituted heteroaryl;
- 20 h) heterocycloalkyl; or
- i) substituted heterocycloalkyl;

or in the alternative, X and Y are taken together with the carbons to which they are attached to for a cyclic moiety selected from: aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;

25



8. A compound of formula I, wherein M is  $-O-$  and Q is

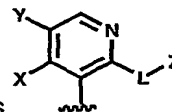
wherein

L is M, where M is as previously defined;

30

X, Y, and Z are each independently selected from:

- a)  $-C_1-C_6$  alkyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 5 b)  $-C_2-C_6$  alkenyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 10 c)  $-C_2-C_6$  alkynyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- d) aryl;
- e) substituted aryl;
- 15 f) heteroaryl;
- g) substituted heteroaryl;
- h) heterocycloalkyl; or
- i) substituted heterocycloalkyl;
- or in the alternative, X and Y are taken together with the carbons to which they are attached to for a cyclic moiety selected from: aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl; or
- 20



9. A compound of formula I, wherein M is  $-O-$  and Q is
- 25 wherein

L is M, where M is as previously defined;

X, Y, and Z are each independently selected from:

- a)  $-C_1-C_6$  alkyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 30



- b)  $-C_2-C_6$  alkenyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- 5 c)  $-C_2-C_6$  alkynyl containing 0, 1, 2, or 3 heteroatoms selected from O, S, or N, optionally substituted with one or more substituent selected from halogen, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl;
- d) aryl;
- 10 e) substituted aryl;
- f) heteroaryl;
- g) substituted heteroaryl;
- h) heterocycloalkyl; or
- i) substituted heterocycloalkyl;
- 15 or in the alternative, X and Y are taken together with the carbons to which they are attached to for a cyclic moiety selected from: aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocycloalkyl, or substituted heterocycloalkyl.
- 20 10. A compound according to claim 1 represented by formula I selected from:
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OEt, M =  $-O-$ , Q = hydrogen, and  $j = n = s = 1$ ;
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OEt, M =  $-O-$ , Q =
- 25  $-S(O)_2CH_3$ , and  $j = n = s = 1$ ;
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OEt, M =  $-O-$ , Q = 2-thiophenyl-quinolin-4-yl, and  $j = n = s = 1$ ;
- 30 Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M =  $-O-$ , Q = 2-thiophenyl-quinolin-4-yl, and  $j = n = s = 1$ ;

- Compound of formula I, wherein A = Boc, B = hydrogen, G = OEt, M is absent, Q = 4,5-diphenyltriazol-2-yl, and j = n = s = 1;
- 5 Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M is absent, Q = 4,5-di-thiophenyltriazol-2-yl, and j = n = s = 1;
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M is absent, Q = 4-(thiophen-3-yl)-5-(p-methoxyphenyl)triazol-2-yl, and j = n = s = 1;
- 10 Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M is absent, Q = 4-(n-butyl)-5-phenyltriazol-2-yl, and j = n = s = 1;
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M is absent, Q = 5-(3-methoxyphenyl)tetrazol-2-yl, and j = n = s = 1;
- 15 Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M is absent, Q = 5-(4-pyridyl)tetrazol-2-yl, and j = n = s = 1;
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M is absent, Q = 5-(3,4-dichlorophenyl)tetrazol-2-yl, and j = n = s = 1;
- 20 Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M is absent, Q = 5-(3-bromo-4-methoxy-phenyl)tetrazol-2-yl, and j = n = s = 1;
- 25 Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M is absent, Q = 4-(4-fluoro-phenyl)-6-phenyl-1H-pyridazin-3-on-2-yl, and j = n = s = 1;
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M is absent, Q = 6-phenyl-5-piperidin-1-yl-1H-pyridazin-3-on-2-yl, and j = n = s = 1;
- 30 Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M = -O-, Q = 7-Methoxy-2-phenyl-quinolin-4-yl, and j = n = s = 1;

- Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M = -O-, Q = 7-Methoxy-2-thiazolyl-quinolin-4-yl, and j = n = s = 1;
- 5      Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M = -O-, Q = 7-Methoxy-2-thiophenyl-quinolin-4-yl, and j = n = s = 1;
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M = -O-, Q = 7-Methoxy-3-(thiophen-2-yl)-1H-quinoxalin-2-yl, and j = n = s = 1;
- 10      Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M = -O-, Q = 6-Methoxy-3-(thiophen-2-yl)-1H-quinoxalin-2-yl, and j = n = s = 1;
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M = -O-, Q = 7-Methoxy-3-[2-(thiophen-2-yl)vinyl]-1H-quinoxalin-2-yl, and j = n = s = 1;
- 15      Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M = -O-, Q = 6-Methoxy-3-[2-(thiophen-2-yl)vinyl]-1H-quinoxalin-2-yl, and j = n = s = 1;
- Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M = -O-, Q = 7-Methoxy-3-[2-(pyridin-2-yl)vinyl]-1H-quinoxalin-2-yl, and j = n = s = 1; or
- 20      Compound of formula I, wherein A = Boc, B = hydrogen, G = OH, M = -O-, Q = 7-methoxy-3-[2-(pyridin -2-yl)vinyl]-1H-quinoxalin-2-yl, and j = n = s = 1.
- 25      11. A pharmaceutical composition comprising an anti-hepatitis C virally effective amount of a compound according to claim 1, or a pharmaceutically acceptable salt, ester, or prodrug thereof, in combination with a pharmaceutically acceptable carrier or excipient.
- 30      12. A method of treating a hepatitis C viral infection in a mammal, comprising administering to the mammal an anti-hepatitis C virally effective amount of a pharmaceutical composition according to claim 11.

13. A method of inhibiting the replication of hepatitis C virus, the method comprising supplying a hepatitis C viral NS3 protease inhibitory amount of the pharmaceutical composition of claim 11.

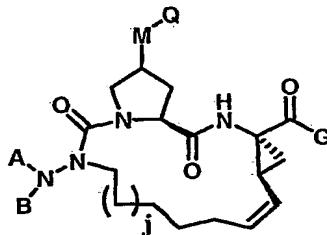
5 14. The method of claim 13 further comprising administering concurrently an additional anti-hepatitis C virus agent.

15. The method of claim 14, wherein said additional anti-hepatitis C virus agent is selected from the group consisting of:  $\alpha$ -interferon,  $\beta$ -interferon, ribavarin, and adamantine.

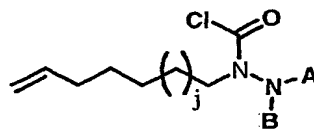
16. The method of claim 14, wherein said additional anti-hepatitis C virus agent is an inhibitor of another target in the hepatitis C virus life cycle, which is selected from the group consisting of: helicase, polymerase, metalloprotease, and IRES.

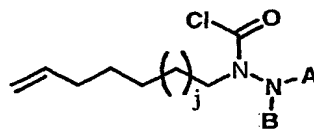
15

17. A process of making compounds of formula I:

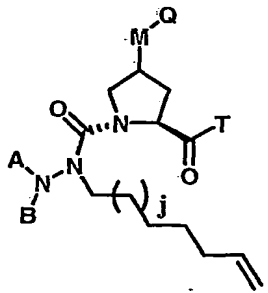


wherein A, B, G, M, Q, j, n, and s are as defined in claim 1, comprising the steps of:



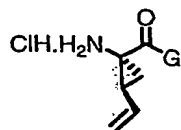
(a) reacting a compound of formula (A): , wherein A, B, and j is as defined in claim 1 with a hydroxyproline ethyl ester derivative of formula (B): in the presence of a base to form a compound of formula (C):

20



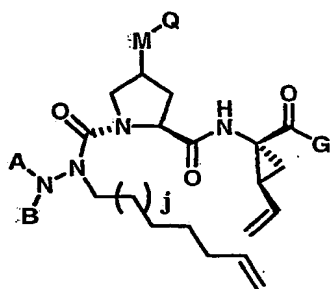
wherein A, B, and j are as defined in claim 1 and T is selected from OH, OMe, or OEt;

(b) reacting a compound of formula B with a compound of formula (D):



, wherein G is as defined in claim 1, under standard amide

formation conditions to form a compound of formula (E):



, wherein A, B, G, M, Q, and j are as defined in

claim 1; and

(c) reacting compound of formula E with a Ruthenium-based catalyst.